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NOTES ON TROPICAL AMERICAN FISHES

BY HENRY W. FOWLER

While studying certain groups of marine fishes in the museum of the Academy I have recently had occasion to examine several old collections which have never been reported. Some include a few types of Cope, of which additional notes and diagnoses are given below. This has been attempted as most all his originals are too brief and lack many of the details demanded by modern standards. The material representing Cope's "Ichthyology of the Lesser Antilles" is largely extant, and is also included. Material from the Bahamas and Jamaica, sent to the University of Pennsylvania, and now in its Zoological Laboratory, was kindly placed at my disposal by Dr. J. Percy Moore.

PANAMA.

A small collection received from Dr. W. S. W. Ruschenberger in 1857, another from Captain Field in 1862, and later some small examples from J. A. McNiel. All from Panama City.

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| 1. <i>Sphyrna zygaena</i> Linné. | 17. <i>Epinephelus labriformis</i> (Jenyns). |
| 2. <i>Rhinobatos leucorhynchus</i> Günther. | (<i>E. ordinatus</i> Cope, Trans. Amer. |
| 3. <i>Urotrygon mundus</i> Gill. | Philos. Soc. Phila., XIV, 1871, |
| 4. <i>Cetengraulis engymer</i> Gilbert and | p. 466.) |
| Pierson. | 18. <i>Rypticus xanti</i> Gill. |
| 5. <i>Dorosoma petenensis</i> (Günther). | 19. <i>Anisotremus taniatus</i> Gill. |
| 6. <i>Myrophis vafer</i> Jordan and Gilbert. | 20. <i>Brachydeuterus leusiccus</i> (Günther). |
| 7. <i>Rabula panamensis</i> (Steindachner). | 21. <i>Polydactylus opercularis</i> (Gill). |
| 8. <i>Muraena clepsydra</i> Jordan and | 22. <i>Pomacentrus rectifrenum</i> Gill. |
| Evermann. | 23. <i>Chaetodipterus zonatus</i> (Girard). |
| 9. <i>Bagre pinnimaculata</i> (Steindach- | 24. <i>Canthigaster punctatissimus</i> (Gün- |
| ner). | ther). |
| 10. <i>Mollienisia sphenops</i> (Valen- | 25. <i>Diodon hystrix</i> Linné. |
| ciennes). | 26. <i>Prionotus horrens</i> Richardson. |
| 11. <i>Fodiator acutus</i> (Valenciennes). | 27. <i>Leptecheneis naucrates</i> (Linné). |
| 12. <i>Hemiramphus saltator</i> Gilbert and | 28. <i>Batrachoides pacifici</i> (Günther). |
| Starks. | 29. <i>Auchenopterus monophthalmus</i> |
| 13. <i>Hippocampus ingens</i> Girard. | (Günther). |
| 14. <i>Sphyræna ensis</i> Jordan and Gilbert. | 30. <i>Hypsoblennius striatus</i> (Steindach- |
| 15. <i>Vomer setapinnis</i> (Mitchill). | ner). |
| 16. <i>Amia retrosella</i> Gill. | |

An old saw from Captain Field is doubtless *Pristis zephyreus* (Jordan and Starks), but without other characters is not certain.

¹ Trans. Amer. Philos. Soc. Phila., (new series) XIV, 1871, pp. 445-483.

RIO DE JANEIRO, BRAZIL

Dr. Ruschenberger, with Dr. Thomas J. Turner, made a small collection of the market fishes, received in 1854. A few examples were also obtained from William Hyde and E. D. Cope, and some presented by the Museum of Comparative Zoology at Cambridge, at a later date.

1. *Elops saurus* Linné.
2. *Chupanodon pseudohispanicus* (Poey).
3. *Harengula pensacolæ* Goode.
4. *Opisthonema oglinum* (Le Sueur).
5. *Anchovia brownii* (Gmelin).
6. *Cetengraulis edentulus* (Cuvier).
7. *Netuma barbus* (Lacépède).
8. *Fistularia tabacaria* Linné.
9. *Holocentrus ascensionis* (Osbeck).
10. *Trichiurus lepturus* Linné.
11. *Oligoplites sabiens* (Bloch).
12. *Alepes amblyrhynchus* (Cuvier).
13. *Caranx hippos* Linné.
14. *C. latus* Agassiz.
15. *Vomer setapinnis* (Mitchill).
16. *Chloroscombrus chrysurus* (Linné).
17. *Seserinus xanthurus* Quoy and Gaimard.
18. *Centropomus constantinus* Jordan and Evermann.
19. *Epinephelus guaza mentzelii* (Valenciennes).
(*E. brachysoma* Cope, Trans. Amer. Philos. Soc. Phila., XIV, 1871, p. 466.)
20. *Diplectrum formosum* (Linné).
21. *Priacanthus arenatus* Cuvier.
22. *P. cruentatus* (Lacépède).
23. *Lutjanus analis* (Cuvier).
24. *Orthopristis ruber* (Cuvier).
25. *Archosargus unimaculatus* (Bloch).
26. *Eucinostomus pseudogula* Poey.
27. *Gerres rhombeus* Cuvier.
28. *Micropogon opercularis* (Quoy and Gaimard).
29. *Geophagus brasiliensis* (Quoy and Gaimard).
30. *Halichares poeyi* (Steindachner).
31. *Bodianus rufus* (Linné).
32. *Cryptotomus ustus* (Valenciennes).
33. *Chaetodipterus faber* (Broussonet).
34. *Holacanthus tricolor* (Bloch).
35. *Balistes vetula* Linné.
36. *Stephanolepis hispidus* (Linné).
37. *Lactophrys triqueter* (Linné).
38. *Spheroides spengleri* (Bloch).
39. *Dactylopterus volitans* (Linné).
40. *Antennarius scaber* (Cuvier).

SURINAM, DUTCH GUIANA.

Dr. Constantine Hering made a very interesting collection at this locality, which was received at the Academy about 1830. A few fishes obtained by Dr. William Keller in 1856 I have not located.

1. *Eulamia oxyrhynchus* (Müller and Henle).
2. *Sphyrna tudes* (Valenciennes).
3. *S. zygaena* (Linné).
4. *Pristis perotteti* Müller and Henle.
5. *Elops saurus* Linne.
6. *Heringia amazonica* (Steindachner).
7. *Odontognathus mucronatus* Lacépède.
8. *Anchovia lepidontostole* Fowler.
(Proc. Acad. Nat. Sci. Phila., 1911, p. 214, fig. 3.)
9. *Pterengraulis atherinoides* (Linné).
10. *Lycengraulis grossidens* (Agassiz).
11. *Synbranchus marmoratus* Bloch.
12. *Selenaspis herzbergii* (Bloch).
13. *Netuma aulometopon* Fowler.
(L. c., 1915, p. 204, fig. 1.)
14. *Rhamdia sebae* (Valenciennes).
15. *Brachyplatystoma vaillantii* (Valenciennes).
16. *Pseudoplatystoma fasciatum* (Linné).
17. *Doras granulosus* Valenciennes.
18. *D. cataphractus* (Linne).
19. *Trachycorystes galeatus* (Linné).
20. *Pseudacanthopterus nodosus* (Bloch).
21. **Ageneiosus porphyreus** Cope.
(Trans. Amer. Philos. Soc. Phila., XIII, 1867, p. 404.)

Head $3\frac{7}{8}$; depth 5; D. I, 7; A. iv, 41; head width $1\frac{2}{3}$ its length; snout $2\frac{2}{3}$; eye $7\frac{1}{2}$; maxillary $2\frac{1}{4}$; interorbital $2\frac{1}{8}$; mouth width $2\frac{1}{4}$; dorsal height 2; pectoral $1\frac{4}{5}$; ventral 2; least depth of caudal peduncle $3\frac{1}{4}$; upper caudal lobe $1\frac{2}{5}$. Body greatly compressed, upper profile straight, lower convex. Caudal peduncle about long as deep. Head wide, greatly depressed, depth over eye half its width. Snout greatly depressed, broadly spatulate, length about $\frac{4}{5}$ its width. Eyes lateral, though more inferior, almost covered by adipose-eyelid, midway in head length. Mouth broad, gape about $\frac{4}{5}$ to eye. Upper jaw produced well beyond lower, its teeth broadly exposed. Mouth roof smooth. Upper buccal fold very broad. Tongue wide, thick, fleshy, not free. Fine concealed maxillary barbel about $\frac{4}{5}$ of eye. Front nostril about first $\frac{2}{3}$ in snout. Hind nostril about midway between snout tip and hind eye edge. Interorbital convex, with long median fontanel which broader anteriorly and not extended back to occipital process. Rakers III 3+4 x, short, lanceolate about $\frac{1}{5}$ of filaments, which nearly long as eye. Body everywhere with smooth skin. Spinous dorsal inserted close behind head or little nearer anal origin than snout tip, fin base about $\frac{1}{3}$ its height. Adipose fin inserted about last third between depressed spinous dorsal tip and caudal base, fin equals $1\frac{1}{2}$ eye-diameters. Anal origin midway between hind eye edge and caudal base, fin long and low, slightly higher anteriorly. Caudal well forked, pointed lobes about equal. Pectoral low, reaches $\frac{3}{4}$ to ventral. Ventral origin at last $\frac{2}{5}$ between pectoral and anal origins, reaches anal. Vent close before anal. Color in alcohol largely dull brownish, paler below. Head above and back with obscure slaty or darker marblings. Fins pale brownish. Length 280 mm. Cotype (type) No. 8389, A. N. S. P.

Also another cotype: Head $3\frac{3}{4}$; depth $5\frac{2}{3}$; D. I, 5; A. iv, 41; snout $2\frac{1}{8}$ in head; eye $7\frac{1}{4}$; maxillary $2\frac{1}{2}$; interorbital 2; length 178 mm. (caudal tips damaged).

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| 22. <i>Platyistius cotylephorus</i> Bloch. | 33. <i>Gasteropelecus sternicla</i> (Linné). |
| 23. <i>Aspredo aspredo</i> (Linné). | 34. <i>Charax gibbosus</i> (Linné). |
| 24. <i>Callichthys callichthys</i> (Linné). | 35. <i>Hoplias malabaricus</i> (Bloch). |
| 25. <i>Plecostomus plecostomus</i> (Linné). | 36. <i>Erythrurus unitaeniatus</i> Agassiz. |
| 26. <i>Loricariichthys typus</i> (Bleeker). | 37. <i>Gymnotus carapo</i> Linné. |
| 27. <i>Loricaria cataphracta</i> Linné. | 38. <i>Sternopygus macrurus</i> (Schneider). |
| 28. <i>Curimata copei</i> Fowler. | 39. <i>Anableps anableps</i> (Linné). |
| (Proc. Acad. Nat. Sci. Phila., 1906, p. 301, fig. 7.) | 40. <i>Pæcilia vivipara</i> Schneider. |
| 29. <i>C. schomburgkii</i> (Günther). | 41. <i>Mugil incilis</i> Hancock. |
| 30. <i>Curimatella alburnus</i> (Müller and Troschel). | 42. <i>Trichiurus lepturus</i> Linné. |
| 31. <i>Astyanax caucanus</i> (Steindachner). | 43. <i>Caranx latus</i> Agassiz. |
| 32. <i>A. bimaculatus</i> (Linné). | 44. <i>Selene vomer</i> (Linné). |
| | 45. <i>Centropomus pectinatus</i> Poey. |

46. *C. parallelus* Poey.
 (*C. heringi* Fowler, l. c., 1906,
 p. 423, fig. 2.)
 47. *C. undecimalis* (Bloch).
 48. *Anisotremus surinamensis* (Bloch).

49. *Cynoscion acoupa* (Lacépède).

50. *Nebrius microps* Cuvier.

51. *Plagioscion squamosissimus* (Heckel).

52. **Plagioscion monacanthus** (Cope).

(*Corvina monacantha* Cope, Trans. Amer. Philos. Soc. Phila., (2) XIII, 1866, p. 402.)

Head $3\frac{1}{4}$; depth $3\frac{1}{4}$; D. X, I, 33; A. II, 6; pores (enlarged scales) in l. l. to caudal base 50; 11 scales above l. l. to soft dorsal origin, 10 below to spinous anal origin; head width 2 in its length; snout 4; eye $6\frac{2}{5}$; maxillary 2; interorbital $3\frac{1}{2}$; third dorsal spine $2\frac{2}{5}$; second anal spine 2; least depth of caudal peduncle $3\frac{1}{3}$; caudal $1\frac{1}{8}$; pectoral $1\frac{1}{4}$; ventral $1\frac{1}{4}$. Body well compressed, back elevated. Head deep, upper profile slightly concave above eye. Snout convex, length $\frac{3}{5}$ its width. Eye center at first $\frac{2}{7}$ in head. Mouth large, lower jaw slightly included. Maxillary reaches hind eye edge. Teeth in bands in jaws, fine, with outer row enlarged, upper little more so. Tongue free, smooth. Nostrils together, close before eye. Interorbital convex. Hind preopercle edge entire, except 2 short points at angle below. Rakers 11 4+10 v, lanceolate, $1\frac{1}{2}$ in eye or longer than filaments. Scales finely ctenoid, in oblique rows on trunk. Large scales on opercle and few behind eye. Of head only lips naked. L. l. of enlarged scales concurrent with dorsal profile to anal, then midway or horizontal, and on caudal to its end. Dorsal spines thin, fourth longest. Soft dorsal inserted slightly nearer caudal base than snout tip, height about uniform. Anal inserted about midway between ventral origin and caudal base, first spine rudiment and second but little less than rays (damaged). Caudal ends in median point behind. Pectoral $1\frac{1}{2}$ to anal. Ventral inserted opposite pectoral origin, first ray ends in filament, spine slightly less than half of fin. Vent well before anal, or at depressed ventral tip. Color in alcohol dull uniform brownish, with brassy and silvery reflections. Caudal and pectoral with three deep brown cross-bars. Length 213 mm. No. 11,519, A. N. S. P., type of *Corvina monacantha* Cope.

The above example has wrongly been referred to *Plagioscion squamosissimus* (Heckel) by Jordan and Eigenmann,² and allowed to repose in its synonymy ever since. It appears identical with *Pseudosciaena surinamensis* Bleeker,³ which name it replaces. In the large anal spine it is allied with *Plagioscion auratus* (Castelnau).

² Rep. U. S. Fish Com., XIV, 1886 (1889), p. 382.

³ Arch. Néerl. Sci. Nat. Harlem, VIII, 1873, p. 458, Pl. 21.

53. *Pachypops grunniens* (Schomburgk). 56. *Cichlasoma bimaculatum* (Linné).
 54. *Ophioscion adustus* (Agassiz). 57. *Dactylopterus volitans* (Linné).
 55. *Sagenichthys ancyllodon* (Schneider). 58. *Dormilator maculatus* (Bloch).

59. ***Eleotris amblyopsis*** (Cope).

(*Culius amblyopsis* Cope, Trans. Amer. Philos. Soc. Phila., XIV, 1871, p. 473.)

Head $2\frac{3}{4}$; depth $3\frac{3}{4}$; D. VI—8, 1; A. I, 8, 1; scales 42 in median lateral series to caudal base and 6 more on latter; 14 scales transversely between soft dorsal and anal origins; about 38 ? predorsal scales; head width $1\frac{2}{3}$ its length; third dorsal spine $2\frac{2}{3}$; sixth dorsal ray $1\frac{7}{8}$; seventh anal ray 2; least depth of caudal peduncle $2\frac{1}{3}$; pectoral $1\frac{2}{3}$; ventral $1\frac{7}{8}$; snout $4\frac{1}{8}$ in head measured from upper jaw tip; eye $5\frac{1}{4}$; maxillary $2\frac{1}{3}$; interorbital $3\frac{1}{4}$. Body well compressed, contour slenderly ellipsoid. Caudal peduncle strongly compressed, slightly longer than deep. Head robust, muzzle obtuse. Snout convex, length $\frac{2}{3}$ its width. Eye small, elongate, center near first third in head. Mouth oblique, large, lower jaw well protruded. Maxillary reaches about center of eye. Teeth fine, in bands in jaws. Tongue broad, depressed, free. Interorbital slightly depressed in front, slightly convex. Preopercle with strong obscure spine, directed downwards. Rakers 6 low knob-like rudiments on lower limb of first arch. Head scaly, except muzzle. Scales small and crowded on predorsal. About 12 rows of fine scales across cheek. From lower eye edge 6 cutaneous ridges radiate down over infraorbital. On head, predorsal, breast and belly scales cycloid, on trunk ctenoid, and also larger on latter behind. Caudal and pectoral bases with small scales, fins otherwise naked. No trace of l. l. Dorsal spines thin, fin inserted slightly nearer snout tip than caudal base, third spine longest, reaches back slightly beyond soft dorsal origin. Last little nearer caudal base than hind preopercle edge, rays gradually higher towards last, not quite reaching caudal base. Anal opposite soft dorsal, similar. Caudal rounded, median rays longest. Pectoral broad, median rays longest, reaches vent. Ventral inserted slightly before pectoral origin, reaches $\frac{2}{3}$ to anal, with small papilla. Color in alcohol dull uniform brownish generally. Dusky brown to blackish line from hind eye edge horizontally back to opercle above, two obliquely down from lower hind edge, and another more obscurely vertically down over infraorbital. Fins all finely barred with narrow dusky-brown lines. Black blotch, little smaller than pupil, just before pectoral origin. Iris slaty. Length 80 mm. (caudal tip damaged). Cotype (type) of *Culius amblyopsis* Cope, No. 10,577, A. N. S. P.

Also Nos. 10,578 and 10,579, A. N. S. P., cotypes, same data. These show: Head 3; depth 4 to $4\frac{1}{3}$; D. VI—8, 1; A. I, 8, 1; scales 44 or 45 in median lateral series to caudal base and 6 or 7 more on latter; 16 scales transversely between soft dorsal and anal origins; 40 to 43 predorsal scales; snout $4\frac{1}{2}$ to $4\frac{3}{4}$ in head measured from upper jaw tip; eye $5\frac{3}{4}$ to 6; maxillary $2\frac{1}{2}$; interorbital 3 to $3\frac{3}{8}$; length 80 mm.

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| 60. <i>Batrachoides surinamensis</i> (Schneider). | 62. <i>Achirus achirus</i> (Linné). |
| 61. <i>Citharichthys spilopterus</i> Günther. | 63. <i>A. lineatus</i> (Linné). |
| | 64. <i>Oncocephalus vespertilio</i> (Linné). |

ST. MARTIN'S ISLAND, WEST INDIES.

Dr. R. E. Van Rijgersma collected in the lower or Dutch portion of the island, likely largely at or about Phillipsburg. The collection was received at the Academy in 1869. This is the most important of Cope's collections embraced in his "Ichthyology of the Lesser Antilles," as it furnished the largest number of his new forms. Cope's account still appears to be the only one dealing with the fish-fauna of this island. Species mentioned by Cope, but which I fail to locate in the collection, are indicated by †. It long appeared clear that a great many specimens were never included in Cope's list, as I recorded some species since, and such as now remain are indicated by the prefixed asterisk. These indications are also applicable to the St. Croix and St. Christopher collections.

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| 1. <i>Ginglymostoma cirratum</i> (Bonnaterre). | 5. <i>Anchovia platyargyrea</i> Fowler. (Proc. Acad. Nat. Sci. Phila., 1911, p. 216, fig. 4.) |
| 2. <i>Albula vulpes</i> (Linné). | 6. <i>Anguilla rostrata</i> Le Sueur. |
| 3. <i>Harengula macrophthalmia</i> (Ranzani). | 7. <i>Myrichthys oculatus</i> (Kaup). |
| 4. <i>H. pensacolæ</i> Goode. | |
8. ***Enchelycore nigrocastaneus*** (Cope).
(*Gymnothorax nigrocastaneus* Cope, Trans. Amer. Philos. Soc. Phila., n. s. XIV, 1871, p. 483.)

Head 8; depth $23\frac{2}{5}$; head width $4\frac{1}{2}$ in its length; snout $5\frac{3}{4}$ from upper jaw tip; eye $9\frac{1}{2}$; upper jaw to rictus $2\frac{1}{4}$; interorbital 9; head $3\frac{5}{8}$ to vent. Body well compressed, also head, latter with flattened sides approximate below. Muzzle slender, acuminate. Snout conic, basal width $1\frac{2}{3}$ its length. Eye slightly advanced. Mouth large, not closing, dentition well exposed. Teeth sharp-pointed, conic or moderately compressed, slightly inclined back. Upper teeth uniserial, erect, vary alternately small or little enlarged, latter but little longer than small lower teeth. Several enlarged erect upper canines at snout tip, another each side and one close before each eye. Inside and little advanced, though close to erect preocular pair of canines, another larger depressible canine each side. Between median and

pair of erect upper teeth at snout tip pair of depressible smaller conic teeth, one each side of median tooth and directed back. Close behind large front erect outer canine each side above 2 inner enlarged depressible conic teeth. Premaxillary teeth large canines, conic, depressible, first close behind median front erect upper tooth, second subequal and median about midway in snout length, last longest and median close before eye. Vomer with one row of low backwardly inclined compressed sharp-pointed teeth, smaller than lateral mandibulars or like smallest along upper jaw edges. Upper teeth begin about opposite eye center, close inside upper laterals inner row of 4 enlarged depressible conic teeth, last well behind eye. Lower teeth largely uniserial, compressed, sharp-pointed, inclined little back, all small except anterior. Pair of erect sharp conic symphyseal canines. In front of mandible each side anteriorly row of 3 enlarged depressible conic canines, first largest in jaw and second shorter than symphyseal pair, third about equal. Mandible elongate, slender, attenuate, protrudes little beyond upper, well curved, surface convex, rami low. Front nostril in short tube near snout tip, hind one long slit about $\frac{2}{3}$ of eye. Interorbital convex. Gill-opening nearly horizontal, about midway in depth, about $\frac{5}{6}$ of eye. Pharynx swollen, grooved below. Pores on head inconspicuous. Dorsal origin about opposite hind edge of gill-opening, like anal moderately high. Caudal $2\frac{1}{2}$ in eye. Vent close before anal. Color in alcohol largely uniform chocolate-brown. At rictus color little darker, or dusky. Edge of gill-opening not noticeably darker. Iris slaty. Fins narrowly edged slightly darker than body-color. Length 610 mm. No. 16,032, A. N. S. P., type of *G. nigrocastaneus* Cope.

9. *Muraena miliaris* (Kaup).

(*Muraena myrialeucostictus* Fowler, Proc. Acad. Nat. Sci. Phila., 1912, p. 18, fig. 4.)

Thyrsoidea miliaris Kaup⁴ is likely this species. He had a larger example, without locality, with "arabesque" figures towards end of tail, arising from the dots running into each other, which was 23.98 in. long. The other, from Martinique, appears to agree, though lack of details do not render this certain. *Muraena multiocellata* Poey⁵ agrees largely in proportions, but it is said to have the lower teeth more serrated and numerous than the upper. Günther appears to have correctly placed Kaup's *T. miliaris* in *Muraena*,⁶ though wrongly includes *Murenothis punctata* Castelnau,⁷ as the latter is

⁴ Cat. Apodal F. Brit. Mus., 1856, p. 90.

⁵ Mém. Hist. Nat. Cuba, II, 1860, p. 324. Cuba.

shown with the dorsal origin about last fourth between mouth-corner and gill-opening. Cope appears the first to wrongly place it in *Gymnothorax*. Obviously in my own account the hind nostril is intended above the front eye edge in a short tube.

10. *Gymnothorax moringua* (Cuvier).

12. *Echidna catenata* (Bloch).

11. *G. carcinognathus* Fowler.

13. *Fundulus antillarum* Fowler.

(Proc. Acad. Nat. Sci. Phila.,
1912, p. 22, fig. 5.)

(L. c., 1916, p. 418, fig. 1.)

*14. **Belone argalus** Le Sueur.

Head $2\frac{3}{4}$; depth $21\frac{3}{4}$; D. II, 13; A. III, 17; scales 200 from shoulder to caudal base and 10 more on latter; 154 scales from occiput to dorsal origin; eye $1\frac{3}{4}$ in postocular; interorbital 2; first branched dorsal ray $1\frac{2}{5}$; caudal peduncle width $2\frac{4}{5}$, least depth $4\frac{1}{2}$; ventral $1\frac{1}{3}$; postocular $5\frac{1}{4}$? in rest of head; pectoral $4\frac{1}{3}$?; lower caudal lobe 5; first branched anal ray $4\frac{1}{3}$. Body subcylindrical, caudal peduncle greatly depressed, with broad keel flaring out each side and continued back over caudal basally for $\frac{2}{3}$. Head large, with very long slender jaws, lower little longer. Eye large, next to upper profile. Maxillary entirely concealed, to front eye edge. Jaws not completely closing basally. Teeth very small. Interorbital broad, depressed, distinctly concave medially. Nasal cavity much smaller than pupil. Rakers 2+5, II, short weak points, about $\frac{2}{5}$ of filaments, latter $2\frac{1}{2}$ in eye. L. l. inferior, extends below keel along caudal peduncle side, but only to caudal base. Head largely scaly. Dorsal origin well behind anal origin, or slightly nearer ventral origin than caudal base, front lobes little elevated. Anal like dorsal, much larger and front lobe greatly longer. Hind caudal edge emarginate, lower lobe slightly longer. Pectoral pointed, reaches 4 to ventral and latter inserted about midway between hind eye edge and caudal base, fin $2\frac{2}{5}$ to anal. Color in alcohol faded dull brownish above, sides and below silvery-white. Line of demarcation from shoulder bounded only by dull leaden line. Side of head, iris and beak silvery-white. Fins all pale. Length 308 mm.

The above example agrees largely with Le Sueur's description,⁶ except he says "lateral line very low, interrupted by ventral fins, and beginning to rise above the base of the anal, are then continued along the middle of the tail upon the carina." What is intended by "pectoral fins small, longer than the half of the space which separates

⁶ Cat. F. Brit. Mus., VIII, 1871, p. 100. Cuba.

⁷ An. Amér. Sud, Poiss., 1855, p. 82, Pl. 42, fig. 3 (head). Rio Janeiro.

⁸ Journ. Acad. Nat. Sci. Phila., II, pt. 1, 1821, p. 125, Pl. 10, fig. 1. Island of Guadaloupe.

their base from the tail" is not clear. Now his figure varies in several respects, and the details are slightly obscure. The dorsal has 26 rays and the anal about 24 ?, the eye about $1\frac{1}{5}$ in postocular, first dorsal ray $1\frac{1}{2}$, first anal ray $1+\frac{1}{5}$, least depth of caudal peduncle $6\frac{1}{2}$, ventral $1\frac{1}{6}$, postocular about 5 in rest of head, pectoral $8\frac{2}{3}$ in total head length, lower caudal lobe about $4\frac{7}{8}$, first anal ray 5 and pectoral 7 or 8 times to ventral.

I have recently examined material sent by the United States National Museum from the Azores and Ascension Island, which I identified as *B. trachura* Valenciennes and appears in every way identical. It is also quite evident that *Belone ardeola* Valenciennes and *B. cigonella* Valenciennes are other synonyms. This species is not a *Tylosurus* as Jordan⁹ has recently announced, but a *Belone* belonging to my subgenus *Platybelone*.

15. ***Strongylura timucu*** (Walbaum).

(*Belone diplothena* Cope, Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 481.)

Head $2\frac{2}{3}$; depth 15; D. II, 14; A. III, 15; scales 230 from shoulder to caudal base and 10 more on latter; 155 scales from occiput to dorsal origin; eye $2\frac{2}{5}$ in postocular; interorbital $2\frac{1}{5}$; first branched dorsal ray $1\frac{1}{3}$; first branched anal ray 1; least depth of caudal peduncle $4\frac{1}{4}$; ventral $1\frac{3}{4}$; postocular $3\frac{1}{3}$ in rest of head; pectoral 4; lower caudal lobe about 4. Body subcylindrical, caudal peduncle slightly depressed, width behind slightly less than its depth. Head large, with long slender jaws, lower little longer. Eye large, next to upper profile. Maxillary not quite to pupil, little behind front eye edge, largely concealed. Teeth small. Jaws not completely closing basally. Interorbital depressed, broad, very slightly concave. Nasal cavity little less than pupil. No rakers. L. 1. runs along lower body edge, ascends caudal peduncle at middle of side and then straight to caudal base medially. Head largely scaly, over sides at least, also including preorbital, side of mandible and maxillary. Dorsal origin well behind anal origin or slightly nearer caudal base than ventral origin, front lobe well elevated. Anal like dorsal, little larger. Caudal emarginate behind, lower lobe little longer. Pectoral pointed, $2\frac{4}{5}$ to ventral, latter inserted slightly nearer caudal base than hind eye edge, about $\frac{1}{3}$ to anal. Color in alcohol faded pale brown on back, sides and lower surface silvery-white. Line of demarcation along back distinct, leaden, and below closely parallel,

⁹ Proc. U. S. Nat. Mus., 55, 1919, p. 398.

narrow, pale yellowish line. Side of head and iris silvery-white. Slight dusky tint on opercle behind and above. Vertical fins and pectoral grayish, ventral paler. Length 305 mm. No. 7,572, A. N. S. P., type of *B. diplotaenia* Cope.

Identical with *S. timucu* (Walbaum), differing apparently in the lateral bluish stripe edged with black and then yellowish all along below. Cope says of *B. diplotaenia* eye 2.5 in postorbital, eye equals interorbital and pectoral equals postorbital, though I find the pectoral about half an eye-diameter longer than postocular.

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| 16. <i>Hyporhamphus unifasciatus</i> (Ranzani). | 34. <i>M. venenosa apua</i> (Bloch). |
| 17. <i>Parexocetus mesogaster</i> (Bloch). | 35. <i>Hypoplectrus unicolor crocotus</i> (Cope). |
| 18. <i>Cypselurus heterurus</i> (Rafinesque). | (<i>Plectropoma crocota</i> Cope, l. c., p. 467, fig. 3.) |
| *19. <i>Aulostomus maculatus Valenciennes</i> . | 36. <i>Rypticus coriaceus</i> (Cope). |
| 20. <i>Atherina laticeps</i> Poey. | (<i>Eleutheractis coriaceus</i> Cope, l. c., p. 467, fig. 3.) |
| 21. <i>Sphyræna barracuda</i> (Walbaum). | †37. <i>Lutjanus synagris</i> (Linné). |
| †22. <i>Hippocampus punctulatus</i> Guichenot. | 38. <i>Ocyurus chrysurus</i> (Bloch). |
| 23. <i>Myripristis jacobus</i> Cuvier. | 39. <i>Rhomboplites aurorubens</i> (Cuvier). |
| 24. <i>Holocentrus ascensionis</i> (Osbeck). | 40. <i>Hæmulon melanurum</i> (Linné). |
| 25. <i>Scomberomorus cavalla</i> (Cuvier). | 41. <i>Bathystoma aurolineatum</i> (Cuvier). |
| 26. <i>Trichiurus lepturus</i> Linné. | 42. <i>Genyatremus luteus</i> (Bloch). |
| †27. <i>Blepharis crinitus</i> (Mitchill). | *43. <i>Eucinostomus pseudogula</i> Poey. |
| 28. <i>Vomer spixii</i> (Swanison). | 44. <i>E. gula</i> (Quoy and Gaimard). |
| 29. <i>Trachinotus glaucus</i> (Bloch). | 45. <i>Upeneus martinicus</i> Cuvier. |
| 30. <i>Pempheris mulleri</i> Poey. | 46. <i>Bairdiella ronchus</i> (Cuvier). |
| 31. <i>Epinephelus maculosus</i> (Valenciennes). | |
| 32. <i>Alphestes chloropterus</i> (Cuvier). | |
| 33. <i>Mycteroperca acutirostris</i> (Valenciennes). | |
| (<i>Epinephelus chalinus</i> Cope, Trans. Amer. Philos. Soc. Phila. n. s. XIV, 1871, p. 465.) | |

47. *Umbrina coroides* Cuvier.

Head $3\frac{3}{5}$ to $3\frac{3}{4}$; depth 3 to $3\frac{3}{5}$; D. X, I, 26 to X, I, 28; A. II, 6; scales 49 in l. l. to caudal base; snout $3\frac{1}{3}$ in head; eye $4\frac{1}{4}$ to $4\frac{1}{3}$; maxillary $2\frac{1}{3}$ to $2\frac{2}{5}$; interorbital $3\frac{2}{3}$ to $3\frac{3}{4}$. Body well compressed, deep, back elevated. Caudal peduncle compressed. Head moderate, compressed. Snout convex, about broad as long. Eye elevated, hind edge midway in head length. Mouth small, inferior, lower jaw included. Maxillary about to front pupil edge. Teeth fine, in bands in jaws. Nostrils together, close before eye. Interorbital convex. Hind preopercle edge finely serrate, and serræ become little enlarged toward angle. Broad preorbital equals eye. Rakers 5 or 6+8 or 9 rudimentary points, fourth or less than filaments, and latter $1\frac{3}{4}$ in eye. L. l. arched nearly concurrent with dorsal profile. Second dorsal spine longest, fin inserted slightly behind

pectoral origin, and depressed tip not quite to soft dorsal origin, which midway between front or hind nostril and caudal base. Soft dorsal nearly uniformly low. Anal inserted about midway between ventral origin and caudal base, second spine enlarged, $2\frac{2}{5}$ to $2\frac{3}{5}$ in head. Pectoral and ventral about equal, $1\frac{1}{3}$ to $1\frac{1}{2}$ in head. In alcohol faded largely uniform brownish, centers of scale rows slightly darker. Lower surface with traces of silvery. Spinous dorsal and caudal tinged dusky. Length of larger 203 mm. (caudal end damaged).

Cope originally separated these two examples as varieties of *U. broussoneti* Cuvier, the smaller and longer example without brown vertical bars and the larger deep one with nine vertical bars.

48. *Eques lanceolatus* (Linné).

49. *Polydactylus plumieri* Lacepede.

†50. *Pomacentrus leucostictus* (Müller and Troschel).

51. *Abudefduf marginatus* (Bloch).

†52. *Microspathodon chrysurus* (Cuvier).

53. *Halichæres cyanocephalus* (Bloch)

54. *H. bivittatus* (Bloch).

55. *Cryptotomus roseus* Cope.

(Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 462, fig. 1.)

56. ***Sparisoma hoplomystax*** (Cope).

(*Scarus hoplomystax* Cope, l. c.)

Head 3; depth $2\frac{3}{5}$; D. IX, 10; A. II, 9; scales 23 in l. l. to caudal base and 2 more on latter; 2 scales above l. l. to spinous dorsal origin and 6 below to anal origin; 4 predorsal scales; snout $2\frac{3}{5}$ in head; eye $4\frac{7}{8}$; mouth $4\frac{3}{4}$; interorbital $4\frac{3}{4}$. Body well compressed, ovoid, deepest about middle of pectoral. Caudal peduncle compressed, least depth $2\frac{1}{2}$ in head. Head compressed, upper profile little more inclined. Snout about long as wide, muzzle compressed. Eye elevated, hind edge about midway in head length. Pupil ellipsoid. Mouth gape slightly inclined forward, about $\frac{3}{5}$ to eye or not quite to front nostril. Three canines on outer face of upper jaw, all flaring out, front pair close together and directed forward. Ten oblique rows of teeth along each side of lower jaw. Front nostril about half an eye-diameter before eye, with fleshy filament about $\frac{4}{5}$ same. Interorbital slightly depressed concavely in front, slightly convex behind. Rakers 4+12 flexible points, $\frac{1}{4}$ of filaments and latter about $4\frac{1}{8}$ in head. Tubes in l. l. arborescent. Row of 5 large scales on cheek. Dorsal spines quite pungent, mostly uniform, second $3\frac{1}{5}$ in head, fin edge entire. Soft dorsal similar, inserted about midway between upper end of gill-opening and caudal base. Anal opposite and like soft dorsal. Caudal convex behind. Pectoral $1\frac{2}{5}$ in head, about $\frac{7}{8}$ to anal. Ventral inserted slightly behind pectoral base, fin $\frac{2}{3}$ to anal. Color in alcohol above largely dull brown-

ish, line of demarcation from level with eye to caudal base medially distinct, with paler brownish color below. Body everywhere with obscure paler or whitish dots or specks, and many obscure darker reticulations above and on side of head. Snout, cheek and head above with many brownish dots. An obscure pale streak from rictus across chin. Pectoral axil and suprascapula with dusky-brown tinge. Pectoral base with row of fine whitish dots. Vertical fins pale brownish, specked or dotted with darker and whitish. Pectoral and ventral pale, latter whitish terminally. Length 139 mm. Type (cotype) of *S. hoplomystax* Cope, No. 9,305, A. N. S. P.

Also Nos. 9,306 and 9,307, and 9,283 to 9,285, cotypes, A. N. S. P. These show: Head $2\frac{5}{8}$ to 3; depth $2\frac{2}{5}$ to $2\frac{3}{5}$; D. IX, 10; A. II, 9; scales 23 in l. l. to caudal base and 2 more on latter; snout $2\frac{2}{3}$ to $2\frac{4}{5}$ in head; eye 4 to $4\frac{1}{2}$; mouth $4\frac{1}{8}$ to $5\frac{2}{5}$; interorbital $4\frac{1}{4}$ to $5\frac{1}{8}$; length 112 to 123 mm.

57. *Sparisoma aurofrenatum* (Valenciennes).

60. *S. flavescens* (Schneider).

Recorded by Cope as *Scarus radians*.

58. *S. abildgaardi* (Bloch).

*59. *S. distinctum* (Poey).

61. ***Callyodon punctulatus*** (Valenciennes).

One example, listed by Cope as *Scarus psittacus* and wrongly included as a synonym of *Scarus taeniopterus* Desmarest by Jordan,¹⁰ who thinks *Scarus diadema* Valenciennes a synonym of the present species. While doubtless his material agrees with the account by Valenciennes,¹¹ *C. punctulatus* is distinguished from *C. diadema* by having its anal fin medianly throughout speckled with dusky. *C. diadema* agrees, however, in the presence of the yellow transverse line connecting the eyes across the interorbital. In *C. taeniopterus* this is not present, though there is a rather broad yellowish band forward from front edge of eye towards end of snout, there meeting its fellow.

62. *C. diadema* Valenciennes.

63. *C. taeniopterus* (Desmarest).

*64. ***C. croicensis*** (Bloch).

Five small examples appear to belong here as they have 2 rows of cheek scales, a rounded caudal and without hind canines above. Although in bad preservation traces of the 2 dark longitudinal bands may be made out. Largest 64 mm.

¹⁰ Rep. U. S. F. Com., XV, 1887 (1891), p. 683.

¹¹ Hist. Nat. Poiss., XIV, 1839, p. 146.

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| 65. <i>Pseudoscarus guacamaia</i> (Cuvier). | 69. <i>Pomacanthus paru</i> (Bloch). |
| 66. <i>Chaetodon sedentarius</i> Poey. | 70. <i>Holacanthus tricolor</i> (Bloch). |
| *67. <i>C. striatus</i> Linné. | 71. <i>Angelichthys ciliaris</i> (Linné). |
| †68. <i>C. capistratus</i> Linné. | *72. <i>Hepatus caeruleus</i> (Schneider). |

73. ***Balistes forcipatus*** Gmelin.

(*Balistes moribundus* Cope, Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 479.)

Head $2\frac{3}{5}$; depth $1\frac{2}{3}$; D. III—29; A. 26; about 42 indistinct scales in median lateral series between gill-opening and caudal base and 4 more on latter¹²; snout $1\frac{2}{3}$ in head; eye $3\frac{1}{4}$; interorbital $2\frac{4}{5}$; fifth dorsal ray 2; fifth anal ray $2\frac{1}{6}$; least depth of caudal peduncle 3; caudal $1\frac{3}{4}$; pectoral $1\frac{1}{2}$. Body contour ellipsoid, compressed, deepest medially. Caudal peduncle and head compressed, latter with upper profile nearly straight and lower slightly convex. Muzzle well compressed, preorbital slightly concave, width about half its length. Mouth small, very slightly superior. Teeth in jaws enlarged medially, each with concave edge. Nostrils together, close before upper front eye edge. Interorbital convex. Gill-opening slightly oblique, about $\frac{4}{5}$ of eye. Body finely spinescent, each scale with about 2 uneven rows of spinules. First dorsal spine robust, spiny in front and spines larger above, its length (broken) at least twice that of third. Soft dorsal origin midway between hind pupil edge and caudal base, front rays highest and fin rounded. Anal similar, opposite. Caudal rounded. Pectoral small. Ventral spine spinescent and flap with 10 slender, pointed spines. Color in alcohol brownish generally, sides of head and trunk with numerous pale bluish spots. Underlaid cloudings of deeper brown and 3 dark brown blotches on back below soft dorsal, larger and more indistinct one below spinous dorsal, and all reflected slightly on fins basally. Membranes of spinous dorsal dusky. Iris deep brown. Fins pale brownish, basally with several somewhat irregular rows of whitish spots. Length 56 mm. No. 781, A. N. S. P., type of *B. moribundus* Cope.

74. *B. vetula* Linné.

75. ***Canthidermis sobaco*** Poey.

(*Balistes asperrimus* Cope, Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 478.)

Head $2\frac{2}{3}$; depth $1\frac{1}{5}$; D. III—26; A. 24; scales about 51 in median lateral series between gill-opening and caudal base and 4 more on latter; snout $1\frac{2}{3}$ in head; eye $3\frac{4}{5}$; interorbital $2\frac{2}{3}$; first dorsal spine

¹² Not 60 as given by Jordan and Evermann, Bull. U. S. Nat. Mus., Bull. 47, II, 1898, p. 1702.

$1\frac{2}{3}$; eighth dorsal ray $1\frac{4}{5}$; fifth anal ray $1\frac{4}{5}$; least depth of caudal peduncle $2\frac{2}{5}$; free caudal rays 2; pectoral $2\frac{2}{5}$. Body deep, well compressed, deepest medially. Caudal peduncle and head compressed, profiles of latter alike. Muzzle well compressed, preorbital depressed, width $1\frac{3}{4}$ its length. Mouth small, terminal. Teeth enlarged medianly in jaws, each with slight concave edge. Nostrils close together, close before front eye edge medially. Interorbital depressed concavely, rather blunt, occipital ridge extending up behind. Gill-opening rather slightly oblique, about $\frac{4}{5}$ of eye. Body everywhere roughly spinescent, spinules largest on middle of side below and about ventral flap. All unpaired fin-rays with row of fine spinules laterally, rows dividing and following branches terminally. Humeral region finely spinescent. First dorsal spine inserted slightly behind eye over gill-opening. Double row of spines down front and one row down each side of first dorsal spine, second and third spines barely $\frac{1}{3}$ of first. Soft dorsal origin about midway between hind pupil edge and caudal base, front median rays highest, fin rounded. Anal similar, opposite. Caudal small, hind edge convex. Pectoral small. Ventral spine spinescent, flap with about 7 irregular small spines not larger than adjacent ones. Color in alcohol rather warm brownish generally, scarcely paler below, and clouded pattern of broad, dark variable lines or reticulations. Dorsal and anal bases each with 3 dark brown blotches, extending as irregular lines on fins. Iris brown. Length 82 mm. Type, of *B. asperrimus* Cope, No. 800, A. N. S. P.

Though Cope gives the type "locality uncertain, but probably St. Martins, W. I.," the original label says "Darien."

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| 76. <i>Canthidermis sufflamen</i> (Mitchill). | 78. <i>Cantherines pullus</i> (Ranzani). |
| An adult example recorded by | 79. <i>Monacanthus ciliatus</i> (Mitchill). |
| Cope as <i>Balistes sobacus</i> . | Listed as <i>M. tomentosus</i> by |
| †77. <i>Xanthichthys ringens</i> (Linné). | Cope. |

80. ***Pseudomonacanthus amphioxys*** (Cope).

(*Monacanthus amphioxys* Cope, Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 477.)

Head $2\frac{3}{5}$; depth $1\frac{7}{8}$; D. II—35; A. 30; snout $1\frac{1}{2}$ in head; eye $3\frac{1}{2}$; interorbital $3\frac{1}{4}$; first dorsal spine $1\frac{1}{4}$; least depth of caudal peduncle $3\frac{1}{4}$; free caudal rays $2\frac{2}{5}$; pectoral about $2\frac{3}{4}$. Body rather elongately ellipsoid, compressed, deepest medially. Caudal peduncle and head well compressed, latter with upper profile slightly concave, lower equally convex. Muzzle well compressed, preorbital strongly concave, width about 3 in length. Mouth small, very slightly superior. Median enlarged lower teeth larger than upper, all with well-notched

edges. Nostrils together, close before front eye edge. Interorbital convex. Gill-opening little inclined, below hind part of eye and equals eye. Body minutely spinescent, slightly rough to touch. First dorsal spine inserted over middle of eye, with row of antrorse serræ along each front edge and another on each hind edge, all becoming smaller towards spine base. Second dorsal spine barely $\frac{1}{4}$ of first. Soft dorsal inserted about midway between front eye edge and caudal base, front median rays longest, apparently (damaged) not over half of first dorsal spine. Anal largely opposite, its origin slightly behind dorsal origin. Caudal slightly convex behind. Pectoral small. Ventral spine rigid, with pair of spines in front, another pair behind and several each side. Color in alcohol pale uniform brownish generally, with brassy reflections below. Iris whitish. Length 61 mm. Cotype (type) of *M. amphioxys* Cope, No. 777, A. N. S. P.

No. 778, same data, cotype in poor condition, about same size. Also No. 779, cotype, same size. It has: Head $2\frac{3}{5}$; depth $1\frac{7}{8}$; D. II—35; A. 32; snout $1\frac{1}{4}$ in head; eye $3\frac{1}{4}$; interorbital $3\frac{1}{4}$; first dorsal spine $1\frac{1}{8}$.

†81. *Alutera scripta* (Osbeck).

82. *Lactophrys triqueter* (Linné).

†83. *L. bicaudalis* (Linné).

†84. *L. trigonus* (Linné).

85. *L. tricornis* (Linné).

86. *Spheroides spengleri* (Bloch).

*87. *S. marmoratus* (Ranzani).

Recorded as *Tetrodon reticularis* by Cope. On comparison with an example from Pine Island, Florida, which I recorded as the preceding species,¹³ I find such to be wrong and that it agrees with Cope's St. Martin's example.

*88. *S. testudineus* (Linné).

90. *Chilomycterus atinga* (Linné).

89. *Canthigaster rostratus* (Bloch).

91. *Eleotris perniger* (Cope).

(*Culius perniger* Cope, Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 473.)

Head $3\frac{1}{3}$; depth 4; D. VI—I, 8, 1; A. I, 8, 1; scales 66 from head to caudal base and 4 more on latter; 22 scales transversely between soft dorsal and anal origins; 58 predorsal scales; head width $1\frac{2}{5}$ its length; mandible $2\frac{1}{5}$; third dorsal spine $2\frac{1}{3}$; seventh dorsal ray $1\frac{1}{2}$; seventh anal ray $1\frac{2}{5}$; least depth of caudal peduncle $2\frac{1}{8}$; pectoral $1\frac{1}{3}$; ventral $1\frac{1}{2}$; snout $4\frac{1}{4}$ in head from upper jaw tip; eye $6\frac{3}{5}$; maxillary $2\frac{3}{5}$; interorbital $3\frac{1}{2}$. Body compressed, deepest at soft dorsal origin. Caudal peduncle well compressed, least depth $1\frac{1}{3}$ its length. Head

¹³ Proc. Acad. Nat. Sci. Phila., 1915, p. 251.

about deep as wide, upper profile deeply concave over eyes. Snout broad, convex, length $\frac{2}{3}$ its width. Eye small, ellipsoid, high, hind edge at first $\frac{2}{3}$ in head. Teeth fine, in bands in jaws, inner row in each enlarged little. Maxillary reaches eye. Lower jaw well protruded. Nostril small, inconspicuous, near snout edge. Interorbital broadly convex, elevated behind. Preopercle with strong spine down and forward. Gill-opening forward last $\frac{2}{3}$ in head. Rakers 2+6 low knobs, and filaments about equal eye. Scales largely uniform, except along body edges where small and crowded. Also small on caudal base, predorsal, top of head and breast. Snout, preorbital and jaws naked, head otherwise scaly. About 15 rows of cheek scales. Dorsal spines fine, slender, fin inserted much nearer hind opercle edge than soft dorsal origin. Latter little nearer hind opercle edge than caudal base, rays elevated gradually to last, which longest. Anal similar, only its insertion little back. Pectoral long, pointed, reaches vent. Ventral pointed, $\frac{4}{5}$ to vent. Ventral papilla long as eye. Color in alcohol largely dark brown, mottled obscurely and finely with darker. Dark brown streak from behind eye to upper opercle edge, another from lower eye edge to median preopercle edge. All fins except first dorsal finely barred with narrow dark brown wavy lines. First dorsal pale, with about 5 dark lines apparently, though very faint. Iris slaty. Length 128 mm. (caudal end damaged). Type of *C. perniger* Cope, No. 10,575, A. N. S. P.

Cope says "first dorsal with white extremity and two longitudinal black bars, one along the base," though more appear present.

92. *Mapo soporator* (Valenciennes).

*93. *Gobiesox cephalus* Lacépède.

94. *G. cerasinus* Cope.

(Trans. Amer. Philos. Soc. Phila., n. s., XIV, 1871, p. 473.)

Head $2\frac{2}{5}$; depth $5\frac{4}{5}$; D. 7; A. 6; head width about $1\frac{1}{5}$ its length; head depth at occiput about $2\frac{1}{4}$; snout $3\frac{2}{5}$; eye $4\frac{3}{5}$; mouth width about $2\frac{1}{3}$; interorbital 5; third dorsal ray $2\frac{1}{2}$; third anal ray $3\frac{1}{5}$; least depth of caudal peduncle $5\frac{1}{5}$; caudal 2; pectoral $2\frac{2}{5}$. Body strongly depressed, depth about uniform. Caudal peduncle compressed, about long as deep. Head greatly depressed, convex above, flattened below. Snout depressed, broad, length $\frac{2}{3}$ its width. Eye slightly advanced from head center, directed above and forward. Mouth broad, lower jaw much shorter. Lips thick, fleshy. Upper teeth in 4 rows in front, outer row largest, compressed and ends slightly convex. Nostrils superior on side of snout, alike, close before eye. Interorbital level. Gill-opening forward about to hind eye edge.

Rakers 6 low rudimentary knobs. Skin everywhere smooth. Lower edge of head, front disk edge (lower pectoral rays) and inner ventral faces papillose. Dorsal inserted about last third between hind eye edge and caudal base, fin $1\frac{3}{5}$ to caudal base. Anal like dorsal, only slightly backward. Caudal truncate. Pectoral broad, not quite far back as ventral. Ventral disk rounded, about $1\frac{1}{3}$ in head. Color in alcohol pale uniform brownish. Length 72 mm. Type, No. 10,363, A. N. S. P.

Cope gives the eye as $3\frac{1}{2}$ in the head, and says it equals the frontal width, which agrees if the bony interorbital is intended.

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| 95. <i>Malacoctenus biguttatus</i> (Cope). | †98. <i>Histrio histrio</i> (Linné). |
| 96. <i>Labrisomus nuchipinnis</i> (Quoy and Gaimard). | 99. <i>Antennarius multiocellatus</i> (Valenciennes). |
| 97. <i>Platophrys lunulatus</i> (Linné). | 100. <i>Onccephalus vespertilio</i> (Linné). |

ST. CROIX ISLAND.

Of Cope's material, reported in his memoir previously noticed, two collections were studied. The first consisted of dried skins, made by Dr. R. E. Griffiths, and the alcoholic preparations were largely from Captain Thomas Davidson, U. S. N.

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| †1. <i>Harengula pensacolæ</i> Goode. | †25. <i>Priacanthus arenatus</i> Cuvier. |
| 2. <i>Synodus intermedius</i> (Agassiz). | †26. <i>Lutjanus griseus</i> (Linné). |
| 3. <i>Chilorhinus suensonii</i> (Lütken). | †27. <i>L. vivanus</i> (Cuvier). |
| 4. <i>Hemiramphus brasiliensis</i> (Linné). | †28. <i>Ocyurus chrysurus</i> (Bloch). |
| 5. <i>Aulostomus maculatus</i> Valenciennes. | †29. <i>Apsilus dentatus</i> Guichenot. |
| 6. <i>Hippocampus punctulatus</i> Guichenot. | †30. <i>Hæmulon melanurum</i> (Linné). |
| 7. <i>Mugil curema</i> Valenciennes. | †31. <i>H. scuirus</i> (Shaw). |
| Recorded as <i>M. brasiliensis</i> by Cope. | †32. <i>H. plumieri</i> (Lacépède). |
| 8. <i>Myripristis jacobus</i> Cuvier. | 33. <i>H. flavolineatum</i> (Desmarest). |
| (<i>Rhinoberyx chryseus</i> Cope, Trans. Amer. Philos. Soc. Phila. n. s., XIV, 1871, p. 464, fig. 2.) | †34. <i>Bathystoma striatum</i> (Linné). |
| 9. <i>Holocentrus ascensionis</i> (Osbeck). | 35. <i>Anisotremus virginicus</i> (Linné). |
| 10. <i>Selar crumenophthalmus</i> (Bloch). | †36. <i>Calamus calamus</i> (Cuvier). |
| 11. <i>Caranx ruber</i> (Bloch). | 37. <i>Eucinostomus gula</i> (Quoy and Gaimard). |
| 12. <i>C. hippos</i> (Linné). | †38. <i>Upeneus maculatus</i> (Bloch). |
| 13. <i>Vomer spixii</i> (Swanison). | 39. <i>Eques acuminatus</i> (Schneider). |
| 14. <i>Trachinotus glaucus</i> (Bloch). | 40. <i>E. punctatus</i> (Linné). |
| 15. <i>T. falcatus</i> (Linné). | 41. <i>E. lanceolatus</i> (Linné). |
| 16. <i>Petrometopon cruentatus</i> (Lacépède). | 42. <i>Pomacentrus leucostictus</i> (Müller and Troschel). |
| 17. <i>Cephalopholis fulvus</i> (Linné). | 43. <i>Abudefduf marginatus</i> (Bloch). |
| 18. <i>Epinephelus striatus</i> (Bloch). | 44. <i>Microspathodon chrysurus</i> (Cuvier). |
| 19. <i>Alphestes chloropterus</i> (Cuvier). | 45. <i>Bodianus rufus</i> (Linné). |
| 20. <i>Mycteroperca ruber</i> (Bloch). | *46. <i>Decodon puellaris</i> (Poey). |
| 21. <i>Hypoplectrus unicolor</i> (Walbaum). | 47. <i>Clepticus paræ</i> (Schneider). |
| 22. <i>H. unicolor guttavarius</i> (Poey). | 48. <i>Halichares radiatus</i> (Linné). |
| 23. <i>Paranthias furcifer</i> (Valenciennes). | 49. <i>H. poeyi</i> (Steindachner). |
| 24. <i>Rypticus saponaceus</i> (Schneider). | 50. <i>H. garnoti</i> (Valenciennes). |
| | 51. <i>Chlorichthys bifasciatus</i> (Bloch). |
| | 52. <i>Sparisoma aurofrenatum</i> (Valenciennes). |

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| 53. <i>S. abildgaardi</i> (Bloch). | 66. <i>Angelichthys ciliaris</i> (Linné). |
| 54. <i>S. flavescens</i> (Schneider). | 67. <i>Hepatus caeruleus</i> (Schneider). |
| Recorded as <i>Scarus chrysopterus</i>
by Cope. | 68. <i>H. hepatus</i> (Linné). |
| 55. <i>S. rubripinne</i> (Valenciennes). | 69. <i>Balistes vetula</i> Linné. |
| 56. <i>Callyodon diadema</i> (Valenciennes). | †70. <i>Xanthichthys ringens</i> (Linné). |
| 57. <i>C. taeniopterus</i> (Desmarest). | †71. <i>Melichthys piceus</i> Poey. |
| 58. <i>C. croicensis</i> (Bloch). | †72. <i>Cantherines pullus</i> (Ranzani). |
| 59. <i>C. vetula</i> (Schneider). | 73. <i>Lactophrys triqueter</i> (Linné). |
| 60. <i>Chaetodon ocellatus</i> Bloch. | 74. <i>L. tricornis</i> (Linné). |
| *61. <i>C. sedentarius</i> Poey. | †75. <i>Scorpaena grandicornis</i> Cuvier. |
| 62. <i>C. striatus</i> Linné. | *76. <i>Labrisomus nuchipinnis</i> (Quoy
and Gaimard). |
| 63. <i>C. capistratus</i> Linné. | 77. <i>Platophrys lunulatus</i> (Linné). |
| 64. <i>Pomacanthus arcuatus</i> (Linné). | †78. <i>Antennarius multiocellatus</i> (Va-
lenciennes). |
| 65. <i>Holacanthus tricolor</i> (Bloch). | |

ST. CHRISTOPHERS, BRITISH WEST INDIES.

Cope also had a small collection from this island, sometimes called St. Kitts, obtained by Benjamin H. Lightfoot.

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| †1. <i>Gymnothorax moringua</i> (Cuvier). | 9. <i>Ocyurus chrysurus</i> (Bloch). |
| Recorded as <i>G. rostratus</i> by
Cope. | (<i>O. rijgersmaei</i> Cope, Trans.
Amer. Philos. Soc. Phila., n. s.,
XIV, 1871, p. 468, fig. 4.) |
| 2. <i>Ablennes hians</i> (Valenciennes). | 10. <i>Apriion macrophthalmus</i> (Müller
and Troschel). |
| 3. <i>Hemiramphus brasiliensis</i> (Linné). | 11. <i>Conodon nobilis</i> (Linné). |
| †4. <i>Caranx hippos</i> (Linné). | *12. <i>Calamus calamus</i> (Cuvier). |
| *5. <i>C. latus</i> Agassiz. | 13. <i>Upeneus maculatus</i> (Bloch). |
| 6. <i>Cephalopholis fulvus</i> (Linné). | 14. <i>U. martinicus</i> Cuvier. |
| †7. <i>Epinephelus maculosus</i> (Valen-
ciennes). | 15. <i>Sparisoma chrysopetrum</i> (Schn). |
| Cope mentions it as <i>E. lunu-
latus</i> . | 16. <i>Pomacanthus paru</i> (Bloch). |
| 8. <i>Lutjanus vivanus</i> (Cuvier). | 17. <i>Holacanthus tricolor</i> (Bloch). |
| (<i>Lutjanus torridus</i> Cope, l. c.,
p. 469; <i>Ocyurus torridus</i> fig. 5). | †18. <i>Hepatus hepatus</i> (Linné). |
| | †19. <i>Balistes vetula</i> Linné. |

JAMAICA.

In 1892 Prof. T. D. A. Cockerell compiled "A Provisional List of the Fishes of Jamaica,"¹⁴ the first attempt to collect in orderly arrangement the species mentioned in the various scattered works. The list by Richard Hill in 1855 is allocated, but as it "is little more than a catalogue of names, many of which are but doubtfully correct," it had best be discarded. As Cockerell gives a short bibliography at the end of his paper, only subsequent papers are mentioned here. *Aulostoma maculatum* and *Rhinobatos undulatus* are recorded by Cockerell¹⁵ the next year, and a little later J. E. Duerden mentions a number of food fishes¹⁶ and C. H. T. Townsend has remarks on *Sicydium*.¹⁷ Jordan and Rutter report the collection of fishes

¹⁴ Bull. No. 1, Inst. of Jamaica (Kingston), 1892, pp. 1-16.

¹⁵ Journ. Inst. Jamaica, I, No. 5, January, 1893, p. 178.

¹⁶ L. c., II, April, 1895, No. 11, pp. 166-7; March, 1899, No. 6, p. 614.

made by Joseph Seed Roberts in Kingston.¹⁸ Boulenger describes *Ceratobatis robertsi*,¹⁹ and finally the writer has given a list of a small collection of fishes obtained at Port Antonio by Charles W. Johnson and William J. Fox.²⁰

During the early winter of 1891 Dr. J. Percy Moore made a collection of the fishes, listed below, in Jamaica. All are now contained in the University of Pennsylvania. Most are food-fishes, or such as were abundant at the time. Locality labels, other than simply Jamaica, are Kingston, Lucea, Port Antonio, and Port Moran, indicated by the letters K., L., A. and M., respectively.

1. *Ginglymostoma cirratum* (Bonnaterre).

2. *Eulamia platyodon* Poey. "Black Shark."

Teeth narrow, entire, at least below. Pectoral width half its length, reaches opposite hind basal dorsal edge. Snout length $\frac{3}{4}$ its width. Length 1012 mm.

3. *Scoliodon terræ-novæ* (Richardson). K. 8. *Gymnothorax funebris* (Ranzani). A.

4. *Sphyrna zygaena* (Linné). L. 9. *Strongylura timucu* (Walbaum). L.

5. *Elops saurus* Linné. L. 10. *S. raphidoma* (Ranzani). L.

6. *Albula vulpes* (Linné). L. 11. *Hemiramphus brasiliensis* (Linné). K.

7. *Synodus foetens* (Linné). K. 12. *Cypselurus lutkeni* (Jordan and Evermann). L.

Head $4\frac{1}{8}$; depth $5\frac{3}{5}$; D. II, 11; A. II, 8; snout $4\frac{1}{4}$ in head; eye $3\frac{1}{8}$; maxillary 4; interorbital $2\frac{1}{2}$. Anal base $1\frac{3}{4}$ in dorsal base. Uppermost pectoral ray simple, second divided, third and fourth longest. Pectoral uniform dusky-brown medially, edges pale. Ventral inserted about midway between last fourth of opercle and caudal base. In alcohol dorsal pale at present, but with traces of dusky above. Length 220 mm. (caudal lobe damaged).

13. *Syngnathus mackayi* (Swain and Meek).

Head $6\frac{1}{4}$; D. 30; rings 16+32; dorsal on two body rings and 6 caudal rings. Snout about $1\frac{2}{5}$ in head. Median snout line with slight keel above and below and smaller lateral keels. Opercle with radiating striæ, not keeled. Dorsal about high as body-ring width, base $1\frac{1}{3}$ in head. Pectoral longer than base. Tail $1\frac{3}{4}$ in total length. Body moderately deep. In alcohol uniform brown. Length 134 mm. Probably Jamaica ?

14. *Hippocampus punctulatus* Guichenot.

¹⁷ l. c., II, April, 1895, No. 11, pp. 175-6.

¹⁸ Proc. Acad. Nat. Sci. Phila., 1897, pp. 91-134.

¹⁹ Ann. Mag. Nat. Hist., (6) XX, 1897, pp. 227-8.

²⁰ Proc. Acad. Nat. Sci. Phila., 1899, pp. 118-119.

D. 17. Snout $2\frac{1}{2}$ in head. Length 65 mm. K.

15. *Fistularia tabacaria* Linné.

Upper lateral snout edges entire. About 350 mm. to end of caudal fin. A.

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| 16. <i>Mugil curema</i> Valenciennes. L. | 21. <i>Selar crumenophthalmus</i> (Bloch). |
| 17. <i>Sphyræna barracuda</i> (Walbaum).
Jamaica? | 22. <i>Caranx ruber</i> (Bloch). |
| 18. <i>S. guachancho</i> Cuvier. L. | 23. <i>C. hippos</i> (Linné). |
| 19. <i>Trichiurus lepturus</i> Linné. K. | 24. <i>C. crysos</i> (Mitchill). |
| 20. <i>Oligoplites saurus</i> (Schneider). L. | 25. <i>C. latus</i> Agassiz. K. L. |
| 27. <i>Chloroscombrus chrysurus</i> (Linné). | 26. <i>Vomer setapinnis</i> (Mitchill). L. |

Head $4\frac{1}{2}$; depth $2\frac{2}{3}$; snout $3\frac{2}{3}$ in head measured from upper jaw tip; eye 4; maxillary $2\frac{3}{4}$; interorbital $3\frac{4}{5}$. Length 290 mm. K. It differs from the nominal *C. ectemurus* Jordan and Rutter in the snout longer than the eye. Also 2 from L.

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| 28. <i>Trachinotus glaucus</i> (Bloch). L. | 47. <i>H. sciurus</i> (Shaw). L. |
| 29. <i>Astrapogon stellatus</i> (Cope). | 48. <i>H. plumieri</i> (Lacépède). A. |
| 30. <i>Centropomus pedimacula</i> Poey. K. | 49. <i>Bathystoma rimator</i> (Jordan and Swain). K. |
| 31. <i>C. mexicanus</i> Bocourt. | 50. <i>Brachydeuterus corvinæformis</i> (Steindachner). M. |
| 32. <i>C. parallelus</i> Poey. | 51. <i>Eucinostomus pseudogula</i> Poey. K. |
| 33. <i>Cephalopholis punctatus</i> (Linné). | 52. <i>E. gula</i> (Quoy and Gaimard). K. |
| 34. <i>Epinephelus flavolimbatus</i> Poey. | 53. <i>Gerres rhombeus</i> Cuvier. L. A. |
| 35. <i>E. striatus</i> (Bloch). K. | 54. <i>G. plumieri</i> Cuvier. L. K. |
| 36. <i>E. maculosus</i> (Valenciennes). | 55. <i>Micropogon furnieri</i> (Desmarest). K. |
| 37. <i>E. morio</i> (Valenciennes). L. | 56. <i>Umbrina coroides</i> Cuvier. |
| 38. <i>Rypticus arenatus</i> Cuvier. | 57. <i>Polydactylus virginicus</i> (Linné). M. |
| 39. <i>Priacanthus cruentatus</i> (Lacépède). | 58. <i>Lachnolaimus maximus</i> (Walbaum). L. |
| 40. <i>Lutjanus griseus</i> (Linné). | 59. <i>Sparisoma rubripinne</i> Valenciennes. L. |
| 41. <i>L. jocu</i> (Schneider). K. | |
| 42. <i>L. analis</i> (Cuvier). K. | |
| 43. <i>L. synagris</i> (Linné). L. K. | |
| 44. <i>Ocyurus chrysurus</i> (Bloch). K. L. | |
| 45. <i>Hæmulon parra</i> (Desmarest). K. | |
| 46. <i>H. melanurum</i> (Linné). | |

60. *Callyodon acutus* Poey.

Head $2\frac{4}{5}$; depth 3; D. IX, 10; A. II, 9; scales 17+6 and 1 more on caudal base; 2 scales above l. l., 6 below; 8 predorsal scales; snout $2\frac{2}{3}$ in head; eye $5\frac{2}{3}$; mouth $5\frac{1}{4}$; interorbital $2\frac{4}{5}$. Body elongate, well compressed, profiles alike. Head compressed, rather pointed. Snout about long as wide. Eye slightly advanced. Mouth half way to eye. No posterior canines. Interorbital convex. Cheek with 3 rows of scales, lowest row of 4 scales on preopercle limb. L. l. interrupted by scale behind, tubes with several slight inconspicuous bifurcations. Caudal scaly basally $\frac{3}{5}$ its length. Dorsal spines flexible. Color in alcohol with broad sulphur-yellow shade as streak below first, then widens above pectoral and extends back to caudal peduncle. Above on head leaden band as if through eye, though little wider than pupil and bordered above with sulphur-yellow,

extending back to about opposite depressed pectoral tip. Back lilac-brown, largely pale. Belly and below very pale brown. Teeth whitish. Iris yellowish. Dorsal pale hyaline greenish, base broadly and edge narrowly yellowish-brown. Anal hyaline-greenish, with narrow basal yellowish-brown line and broad submarginal band. Pectoral and ventral pale. Caudal brownish, upper and lower edges pale. Length 180 mm. L.

61. *C. caeruleus* (Bloch).

62. **C. emblematicus** (Jordan and Rutter).

Head 3; depth 3; D. IX, 10; A. III, 9; scales 17+5 and 2 more on caudal base; 2 scales above l. l., 6 below; snout $2\frac{3}{5}$ in head; eye 5; mouth $4\frac{3}{5}$; interorbital $3\frac{1}{5}$. Body well compressed, profiles alike, evenly ellipsoid. Head compressed. Snout long as wide. Eye slightly advanced. No posterior canines. Interorbital convex. Cheek with 3 rows of scales, lowest row on preopercle limb of 4. Scales on caudal base over $\frac{3}{5}$ of fin. Dorsal spines rather pungent, with flexible ends. Color in alcohol pale buff brown generally. Broad lengthwise deep brown band from above eye to last dorsal ray bases, another from snout tip through eye to upper caudal lobe medially. Fainter third parallel band begins in cheek below preorbital, extends to pectoral base and then to lower caudal lobe medially, where ending in slight spots. Rows of scales below pectorals each with median white line, which extends from gill-opening till opposite vent, and rows number three. Fins all pale brownish, edges of dorsal and caudal, also caudal base, same. Length 150 mm. L.

Callyodon margarita Fowler,²¹ from Panama, is undoubtedly a synonym, the four upper posterior canines simply a variation. Jordan and Evermann do not indicate the lower dark band along the lower side of the head or distinct at caudal base, and there is no indication of white abdominal lines, nor are they mentioned by Jordan and Rutter.

63. *Chaetodon striatus* Linné. L.

66. *Angelichthys ciliaris* (Linné).

64. *C. capistratus* Linné. L.

67. *Hepatus caeruleus* (Schneider). A.

65. *Pomacanthus arcuatus* (Linné). L.

68. **Melichthys piceus** Poey.

D. III—34; A. 32; scales 55 from gill-opening to caudal base; snout $1\frac{1}{4}$ in head; eye $4\frac{1}{2}$ in snout; interorbital $1\frac{5}{6}$; first dorsal spine $1\frac{2}{5}$; pectoral $1\frac{5}{6}$. Caudal truncate, ends pointed. Color in alcohol

²¹ Proc. Acad. Nat. Sci. Phila., 1917, p. 133, fig. 2. Colon.

black, with narrow white line along dorsal and anal bases. Caudal entirely black. Length 295 mm. L.

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| 69. <i>Monacanthus hispidus</i> (Linné). K. | 78. <i>Dactylopterus volitans</i> (Linné). K. |
| 70. <i>Alutera punctata</i> Agassiz. K. | 79. <i>Philypnus dormitor</i> (Lacépède). L. |
| 71. <i>Lactophrys triqueter</i> (Linné). | 80. <i>Mapo soporator</i> (Valenciennes). L. |
| 72. <i>L. tricornis</i> (Linné). K. A. L. | 81. <i>Ctenogobius lyricus</i> (Girard). L. |
| 73. <i>L. bicaudalis</i> (Linné). L. | 82. <i>Gobionellus oceanicus</i> (Pallas). L. |
| 74. <i>Spheroides testudineus</i> (Linné). K. | 83. <i>Leptecheneis naucrates</i> (Linné). K. |
| 75. <i>Chilomycterus atinga</i> (Linné). L. | 84. <i>Malacanthus plumieri</i> (Bloch). |
| 76. <i>Scorpena plumieri</i> Bloch. L. | |
| 77. <i>Prionotus rubio</i> Jordan. K. | |

85. **Gobiesox cerasinus** Cope.

D. 6. A. 7. Upper teeth irregularly in several series, and lower teeth entire incisors. Head broad as long. Color in alcohol pale brownish, apparently reddish when fresh.

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| 86. <i>Malacotenus gillii</i> (Steindachner). L. | 88. <i>Achirus lineatus</i> (Linné). L. |
| 87. <i>Citharichthys spilopterus</i> Günther. L. | 89. <i>Oncocephalus vespertilio</i> (Linné). |

HAYTI.

While at Port-au-Prince in December, 1917, Mr. P. C. Houseman secured a few fishes which he presented to the Academy. They are listed below. The few papers relative to the fish-fauna of Hayti-Santo Domingo, are chiefly Hilgendorf's account²² and the notes on the Eckman collection by Lönnberg.²³ Various scattered records and descriptions are found in the principal works of Cuvier, Valenciennes, Dumeril, Gunther and Vaillant and Bocourt. Evermann and Clark²⁴ described several new forms more recently and the viviparous cyprinodonts are included in Regan's paper,²⁵ while *Rivulus heydei* is described by Nichols.²⁶ Finally, the writer²⁷ reported the Gabb collection from Santo Domingo, received at the Academy in 1871, 1872 and 1874.

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| 1. <i>Atherina laticeps</i> Cuvier. | 3. <i>Abudefduf mauritii</i> (Bloch). |
| 2. <i>Gerres rhombeus</i> Cuvier. | |

BAHAMAS.

Cope gives the first faunal list in his "Ichthyology of the Lesser Antilles," already referred to. This was based on the collection made by Dr. H. C. Wood at Nassau, and received at the Academy

²² Sitz. Ges. Naturf. Freunde Berlin, 1889, pp. 51-55.

²³ Oefvers. Svensk. Vet. Akad. Förh., LII, 1895, pp. 657-663.

²⁴ Proc. U. S. Nat. Mus., XXX, 1906, pp. 851-855, figs. 1-3.

²⁵ Proc. Z. S. London, 1913, pp. 977-1018, Pls. 99-101.

²⁶ Bull. Amer. Mus. N. Hist. N. Y., XXXIII, 1914, pp. 143-144.

²⁷ Copeia, No. 24, November 19, 1915, p. 50.

in 1861. Such material as is still extant and which I examined is indicated by the prefixed asterisk. Several subsequent papers by Jordan and Bollman,²⁸ Garman²⁹ and B. A. Bean³⁰ are important contributions. In November and December of 1890 Dr. J. Percy Moore visited New Providence Island at Port Nassau, Grand Inagua, Fortune Island, Eleuthera, and Grand Cayman, localities indicated respectively by P., G., F., E. and C. This material, with a few fishes obtained at Port Nassau by the late Prof. C. S. Dolley, is in the University of Pennsylvania.⁴¹

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| *1. <i>Harengula pensacolæ</i> Goode. E. | 20. <i>Diplectrum formosum</i> (Linné). E. |
| *2. <i>H. macrophthalmia</i> (Ranzani). | 21. <i>Rypticus saponaceus</i> (Schneider). |
| 3. <i>Conger conger</i> (Linné). C. | G. |
| *4. <i>Gymnothorax moringua</i> (Cuvier). | 22. <i>Lutjanus griseus</i> (Linné). G., P. |
| 5. <i>Exocætus volitans</i> Linné. North | 23. <i>L. apodus</i> (Walbaum). F. |
| of Bahama Bank. | *24. <i>L. analis</i> (Cuvier). F. |
| *6. <i>Hippocampus punctulatus</i> Guichenot. | *25. <i>L. brachypterus</i> Cope. |
| One from Mrs. G. A. Hubbell. | (<i>Lutjanus brachypterus</i> Cope, |
| *7. <i>Holocentrus ascensionis</i> (Osbeck). F. | l. c., p. 470.) |
| *8. <i>H. siccifer</i> Cope. | *26. <i>Ocyurus chrysurus</i> (Bloch). P. |
| (<i>Holocentrum sicciferum</i> Cope, | *27. <i>Hæmulon album</i> Cuvier. G., P. |
| Trans. Amer. Philos. Soc. Phila. | *28. <i>H. melanurum</i> (Linné). P. |
| XIV, 1871, p. 465.) | 29. <i>H. sciurus</i> (Shaw). |
| *9. <i>Selar crumenophthalmus</i> (Bloch). | *30. <i>H. plumieri</i> (Lacépède). P., G. |
| *10. <i>Caranx ruber</i> (Bloch). | *31. <i>H. flavolineatus</i> (Desmarest). F. |
| *11. <i>Trachinotus glaucus</i> (Bloch). | *32. <i>Anisotremus virginicus</i> (Linné). |
| *12. <i>Astrapogon stellatus</i> (Cope). | 33. <i>Calamus calamus</i> (Valenciennes). |
| (<i>Apogonichthys stellatus</i> Cope, | F., P. |
| l. c., p. 400.) | *34. <i>C. bajonado</i> (Schneider). P. |
| *13. <i>Petrometopon cruentatus coronatus</i> . | 35. <i>C. proridens</i> Jordan and Gilbert. |
| *14. <i>Cephalopholis fulvus</i> (Linné). G., | E. |
| P., E., F. | *36. <i>Eucinostomus pseudogula</i> Poey. |
| *15. <i>C. fulvus ouatalibi</i> (Valenciennes). | *37. <i>E. gula</i> Quoy and Gaimard. |
| 16. <i>Epinephelus niveatus</i> (Valenciennes). P. | *38. <i>Upeneus martinicus</i> Cuvier. G. |
| *17. <i>E. striatus</i> (Bloch). | 39. <i>U. maculatus</i> (Bloch). P. |
| Several examples in the University collection, one from Nutria and one from Prof. Dolley. | 40. <i>Micropogon furnieri</i> (Desmarest). F. |
| *18. <i>E. maculosus</i> (Valenciennes). | *41. <i>Pomacentrus leucostictus</i> (Müller and Troschel). |
| 19. <i>E. ascensionis</i> (Osbeck). Conez (Dolley). | *42. <i>Abudefduf marginatus</i> (Bloch). |
| | *43. <i>Lachnolaimus maximus</i> (Walbaum). |
| | *44. <i>Bodianus rufus</i> (Linné). |
| | 45. <i>Halichæres bivittatus</i> (Bloch). F. |
| | *46. <i>Chlorichthys bifasciatus</i> (Bloch). |

47. **Sparisoma niphobles** Jordan and Bollman.

Upper canine each side. Caudal truncate when expanded, slightly emarginate when closed. No scarlet stripe below eye to mouth

²⁸ Proc. U. S. Nat. Mus., 1889, pp. 549-553.

²⁹ Bull. Lab. Univ. Iowa, IV, 1896, pp. 76-93, 4 Pls.

³⁰ The Bahama Islands (Baltimore), 1905, pp. 293-325. Pl.

⁴¹ I also found *Exocætus volitans* Linné, *Atherina laticeps* Poey and *Mugil curema* Valenciennes, in the University collection labeled Crooked Island, French West Indies.

angle. Pectoral $4\frac{1}{2}$ in total length. Pectoral base dusky, axillary spot obsolete. Opercular edge brownish, not dusky. Chin and head below pale uniform brownish. Length 190 mm. G.

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| 48. <i>S. aurofrenatum</i> (Valenciennes). G. | *62. <i>Spheroides spengleri</i> (Bloch). |
| 49. <i>S. abildgaardii</i> (Bloch). P. | *63. <i>Chilomycterus atinga</i> (Linné). |
| 50. <i>S. rubripinne</i> (Valenciennes). G. | *64. <i>Dactylopterus volitans</i> (Linné). |
| 51. <i>Callyodon tenuipterus</i> (Desmarest). G. | *65. <i>Mapo soporator</i> (Valenciennes). |
| *52. <i>Chaetodon ocellatus</i> Bloch. | *66. <i>Leptecheneis naucratis</i> (Linné). |
| 53. <i>C. capistratus</i> Linné. G. | 67. <i>Malacanthus plumieri</i> (Bloch).
P., C. |
| *54. <i>Pomacanthus arcuatus</i> (Linné). | 68. <i>Carapus affinis</i> (Günther). |
| *55. <i>Angelichthys ciliaris</i> (Linné). G. | Two from the Bahamas, in 1877
(Dolley). |
| *56. <i>Hepatus caeruleus</i> (Schneider). | *69. <i>Malacocentrus biguttatus</i> (Cope). |
| *57. <i>H. hepatus</i> (Linné). | (<i>Labrisomus biguttatus</i> Cope,
Trans. Amer. Philos. Soc. Phila.
n. s., XIV, 1871, p. 473.) |
| 58. <i>H. bahianus</i> (Castelnau). P. | 70. <i>Platyphrys lunatus</i> (Linné). |
| *59. <i>Alutera schoepffii</i> (Walbaum). | |
| 60. <i>Lactophrys triqueter</i> (Linné). G. | |
| *61. <i>L. tricornis</i> (Linné). G. | |

FLORIDA.

During March and April, 1918, a small collection of rather large commercial fishes was sent to the Academy for determination in fresh state. As several were desiderata they were placed in the museum. In the summer of 1916 a number of live fishes as sent to the Philadelphia Aquarium from Key West, and afterward several were received at the Academy. The latter are indicated below by the prefixed asterisk. On March 10, 1917, Mr. Morgan Hebard collected a few fishes at Biscayne Bay and Soldier Key. During May of 1919 Mr. Hebard made another collection, at Useppa Island in Charlotte Harbor. All his material has kindly been presented to the Academy, and I am further indebted to him for the field-notes, common names, etc., included below. Localities given below refer to his material exclusively.

1. *Jenkinsia stolidus* (Jordan and Gilbert).

Color in life translucent. Found in large schools in deep water. Useppa Island.

2. *Harengula pensacola* Goode and Bean. "Hard-scaled Sardine."

With the next in large schools in deep water. Both shy and taken in cast-nets. Useppa Island.

3. *Opisthonema oglinum* (Le Sueur). "Soft-scaled Sardine."

4. *Fundulus grandis* Baird and Girard. "Chub."

Largest female 145 mm. and male 103 mm. When fresh male with hind caudal edge rather broadly gray-white, though pale bluish in the live fish while in the water. Anal and dorsal basally, and

caudal, with fine white dots. Upper dorsal edge, most of anal, and all of ventral and pectoral rich orange. In life each scale on sides with the pale or median areas of the preserved fish brilliant metallic greenish-blue.

These fish live in polluted shallow water, not roving about, and where the bottom is a dark ooze. The larger females were found in the deeper shoals in schools, usually about sandy bottoms. They were active, constantly moving about. In life much paler. Useppa Island.

5. **Cyprinodon mydrus** Goode and Bean.

Lives on sandy bottoms in shoals. Though shy during the day they were easily captured at night with a light. Like the "sand perch" the dark vertical bands are conspicuous features at night as viewed from above with the aid of an artificial light. The bands disappear, however, as soon as the fish are lifted from the water. In life the spots on the head and trunk are very brilliant golden. Useppa Island.

6. **Mollienisia latipinna** Le Sueur.

Local in polluted water with bottom of dark ooze. Useppa Island.

7. **Strongylura notata** (Poey). "Needle Fish."

A number of young examples without scales. Found on the surface in shoals. Useppa Island.

8. **Hyporhamphus roberti** (Valenciennes). "Bally-hoo." "Hound-fish."

When fresh end of mandible deep blood-red. Dorsal and anal lobes and most of caudal blackish, and former conspicuously contrasted with whitish bases. Sides of body and eye brilliant silvery-white. Back pale olive-green, each scale with broad dark olive submarginal streak. Pectoral grayish. Ventral white. Length 222 mm. Useppa Island.

9. **Hemiramphus brasiliensis** (Linné).

Ocean off Biscayne Bay. Although Jordan recently contends *H. balao* Le Sueur is distinct I have been unable to distinguish it among my collections.

I have seen this species, while in the Florida Keys in 1904, rise out of the water and with a peculiar sculling motion of the tail, all the time the fish appearing nearly vertical in the air, move along the surface a hundred feet or more. Mr. Hebard recently saw numbers of the preceding also rise out of the water, as his boat pushed on, and elevate their bodies about 60° and move off in similar manner

for 50 to 100 feet. Sometimes they would leave the water completely, though only for very short intervals or spaces of about 4 to 8 feet. The whole performance is quite suggestive of flying-fishes.³²

*10. *Holocentrus ascensionis* (Osbeck). 11. *Mugil cephalus* Linné.

12. *M. curema* Valenciennes.

Six young in the Querimana stage from Useppa Island 18 to 20 mm. long, and having 10 branched anal rays. A larger example, also in the same stage or about 45 mm. long and which I assigned to *M. cephalus*³³ agrees. It is also likely that the one I identified as the young of *M. curema*³⁴ from Santo Domingo is really *M. cephalus*.

Mr. Hebard found the young mullets in very small schools, of about 5 to 20 individuals, at the surface. A small quadrate area of the dorsal portion of the back was out of the water, conspicuously shining silvery, though other parts of the body hardly noticeable. These fish dart forward, all together, in short jerks, and would not leave the surface unless greatly alarmed. When disturbed or scattered they reassembled in a few moments at the surface.

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| 13. <i>Menidia peninsulae</i> Goode and Bean. "Glass Minnow." Found in schools on sandy bottoms in the shoals. Useppa Island. | 31. <i>Calamus proridens</i> Jordan and Gilbert. |
| 14. <i>Caranx hippos</i> (Linné). | 32. <i>Lagodon rhomboides</i> (Linné). "Pinfish." Useppa Island. Common in shoals, among weeds and under docks. |
| 15. <i>Trachinotus falcatus</i> (Bloch). | 33. <i>Archosargus probatocephalus</i> (Walbaum). |
| 16. <i>T. carolinus</i> (Linné). | 34. <i>Diplodus holbrooki</i> (Bean). "Sailor's Choice." Useppa Island. Locally with the grunts in deep water about docks. |
| 17. <i>Centropomus undecimalis</i> (Bloch). | 35. <i>Eucinostomus harengulus</i> (Goode and Bean). "Sand Perch." "Sand Brem." Useppa Island. These vernaculars also applied to the next, though the species not distinguished by the fishermen. Both were moderately common in shoals, particularly on sandy bottoms. |
| *18. <i>Epinephelus striatus</i> (Bloch). | 36. <i>E. gula</i> (Valenciennes). |
| *19. <i>E. maculosus</i> (Valenciennes). | 37. <i>Cynoscion nebulosus</i> (Cuvier). |
| 20. <i>E. morio</i> (Valenciennes). | 38. <i>Bairdiella chrysura</i> (Lacépède). Useppa Island. Young examples, all showing 3 large spines at preopercle angle. |
| *21. <i>Mycteroperca bonaci</i> (Poey). | 39. <i>Sciaenops ocellatus</i> (Linné). |
| 22. <i>M. microlepis</i> (Goode and Bean). | |
| 23. <i>Diplectrum formosum</i> (Linné). Biscayne Bay. | |
| 24. <i>Lutjanus griseus</i> (Linné). "Mangrove Snapper." Soldier Key and Useppa Island. Young, numerous under docks at latter locality. | |
| 25. <i>L. synagris</i> (Linné). | |
| 26. <i>Hæmulon sciurus</i> (Shaw). Soldier Key. | |
| 27. <i>H. plumieri</i> (Lacépède). | |
| *28. <i>Bathystoma rimator</i> (Jordan and Swain). | |
| *29. <i>Anisotremus virginicus</i> (Linné). | |
| 30. <i>Orthopristis chrysopterus</i> (Linné). "Grunt." Useppa Island. Very abundant in deep water about docks. | |

³² Proc. U. S. Nat. Mus., 55, 1919, p. 397, fig. Havana.

³³ Proc. Acad. Nat. Sci. Phila., 1903, p. 744, fig. 1.

³⁴ L. c., fig. 2.

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| 40. <i>Leiostomus xanthurus</i> Lacépède.
"Spot."
Useppa Island. | 45. <i>B. carolinensis</i> Gmelin. |
| *41. <i>Chaetodipterus faber</i> (Broussonet). | 46. <i>Monacanthus hispidus</i> (Linné). |
| *42. <i>Pomacanthus arcuatus</i> (Linné). | 47. <i>Spheroides harperi</i> Nichols. |
| *43. <i>Angelichthys ciliaris</i> (Linné). | 48. <i>Lactophrys tricornis</i> (Linné). |
| 44. <i>Balistes vetula</i> Linné. | 49. <i>Chilomycterus schæpfi</i> (Walbaum). |
| | 50. <i>Opsanus tau</i> (Linné).
Biscayne Bay. |
51. ***Rhombochirus osteochir*** (Cuvier).

Head $4\frac{1}{3}$; depth 8; D. XVIII—III, 22; A. III, 22; P. I, 22; snout $2\frac{1}{3}$ in head measured from upper jaw tip; eye 7; maxillary 3; inter-orbital $1\frac{1}{3}$. Body slender in profile, depressed in front and moderately elongate, slender caudal peduncle compressed. Head width about $1\frac{1}{4}$ its length. Snout broad, half long as wide. Eye small, high, hind pupil edge about midway in head length. Mouth broad, gape about half way to eye. Maxillary ends before eye slightly less than eye diameter. Upper teeth in 3 rows, inner largest, well spaced and fewest, median irregular, and very minute outer close-set, even, simple, conic, forming lashed or ribbed appearance, especially along each side of jaw within mouth. Outer upper teeth also extend on premaxillary, followed by 4 or 5 large well-spaced teeth on maxillary edge. Band of fine teeth in lower jaw, most pronounced on sides of jaw anteriorly but not evident posteriorly or at symphysis so none extend back beyond fine teeth on premaxillary. Broad band of minute vomerine teeth edged in front and anteriorly with row of larger teeth. Tongue narrow, free in front and covered with fine teeth. Gill-opening extends forward about opposite maxillary tip. Rakers I, 1+9 III, lanceolate, about half length of filaments. Skin smooth, apparently scaleless. Disk width about $2\frac{1}{4}$ its length, which $2\frac{1}{2}$ from snout tip to caudal base, laminae quite spinescent. Dorsal origin midway between twelfth disk lamina and caudal base, fin elevated from first dorsal ray. Anal inserted very slightly behind dorsal origin, similar. Caudal $1\frac{2}{3}$ in head, hind edge concave and lobes convex, though lower slightly longer. Pectoral rhomboid, rays very rigid or stiff, fin rhomboid, $1\frac{2}{3}$ in head. Ventral inserted directly behind pectoral base, $2\frac{1}{4}$ in head. Color when fresh in alcohol largely pale to whitish on disk and variably over upper left side, including eye and most of pectoral. Pale area also gives off pale line down to vent and inside gill-opening. Iris whitish with pale yellowish tint. Though left pectoral largely white, except gray border, and basal blotch, right pectoral dull purplish-brown with pale inferior blotch. Dorsal and anal slaty-black or nearly whitish narrowly along bases. Caudal dusky to blackish medially, lower

lobe marginally pale gray, upper darker. Anterior to vent dark body color mostly purplish-gray, posteriorly brownish. Ventral neutral dusky with very narrow pale edge behind. Length 133 mm.

The above example of this rare fish was found on an adult *Istiophorus nigricans* captured in the Gulf Stream $1\frac{1}{2}$ miles south of Fowey Rock Light, Florida, in March, 1919. It was secured for the Academy by Mr. Morgan Hebard. He tells me the *Istiophorus* was 6 feet 8 inches long and when hauled on board the *Rhombochirus* continued to adhere to the post-pectoral region of its host, remaining quiet. When pulled off by the tail it became quite active. Mr. Hebard also notes that in life the color had a smooth and immaculate mouse-brown appearance, strikingly marked about the pectoral, head and disk with whitish. While alive these markings were symmetrical, though now as described previously, the change took place immediately after death. In life the pectorals had conspicuous dark borders and pale centers.

Valenciennes figures the species from the sea of the Antilles, showing the dorsal origin about midway between the sixth dorsal lamina and the caudal base, color largely uniform brownish with neutral tints or only disk pale, pectoral brown, ventral pale or gamboge and the eye much smaller than in my example.³⁵ Poey examined several examples which he named *Echeneis tetrapturorum*³⁶ up to 300 mm. long. As may be inferred, Poey's examples were all from *Tetrapturus*, while the present one seems to indicate a new host for the species.

³⁵ Cuv. Règne Animal (Ed. Ill.,) 1839, 312, Pl. 108, fig. 3.

³⁶ Mém. Hist. N. Cuba, II, 1858, p. 256, Pl. 18, fig. 2 (pectoral fin). Cuba.